

CLAIMS

1. A method of analysing a bundle of banknotes, which method comprises the steps of providing a bundle of banknotes, which bundle
5 comprises at least one surface defined by the edges of banknotes, illuminating the surface of said bundle, providing a two-dimensional image of the bundle by making use of an optical sensor, and providing an output signal that represents the result of the analysis, characterized in that the provision of the two-dimensional image is carried out in such
10 a manner that the image is enlarged in the y-direction, which y-direction is defined as the height of the bundle of banknotes.
2. A method according to claim 1, characterized in that the image is reduced in the x-direction, which x-direction is defined as the width of the bundle of banknotes.
- 15 3. A method according to any one or more of the claims 1-2, characterized in that the step of providing the two-dimensional image of the bundle and obtaining an output signal comprises the step of carrying out an image processing operation, using a pixel matrix.
4. A method according to claim 3, characterized in that the
20 step of carrying out an image processing operation comprises the provision of a pixel matrix in which the number of pixels in the y-direction is larger than the number of pixels in the x-direction.
5. A method according to claim 4, characterized in that the number of pixels in the y-direction is at least 3 times larger than the
25 number of pixels in the x-direction.
6. A method according to claim 4, characterized in that the number of pixels in the y-direction is preferably at least 5 times larger than the number of pixels in the x-direction.
7. A method according to any one or more of the claims 3-6,
30 characterized in that the step of carrying out the image processing operation comprises the steps of awarding a value corresponding to the

optical density to a pixel, determining a threshold value of the optical density, awarding a priority to a pixel having an optical density value higher than the threshold value while determining the so-called second derivative of the density profile of the surrounding pixels, determining
5 an average value of the density for a row of pixels in the y-direction, which row comprises one or more pixels having a priority, determining the spread and the standard deviation of the average value thus determined, and providing an output signal which is the summation of the number of average values higher than the threshold value.

10 8. A method according to any one or more of the claims 1-7, characterized in that the bundle is subjected to one or more than destructive operations prior to said illuminating step.

9. A method according to claim 8, characterized in that according to said destructive operation one or more sides or edges of the
15 bundle of banknotes is subjected to a mechanical operation, such that one or more clean surfaces are obtained, which clean surfaces are used in analysing the bundle of banknotes.

10. A method according to any one or more of the preceding claims, characterized in that the analysis comprises the determination of
20 one or more of the following parameters, viz. the authenticity, the number of banknotes, the value and the fitness of the bundle of banknotes.

11. A method according to any one or more of the claims 1-10, characterized in that said irradiation with UV light is carried out on
25 one side of a bundle of banknotes.

12. A method according to any one or more of the claims 1-10, characterized in that said irradiation with infrared light is carried out on one side of a bundle of banknotes.

13. A method according to any one or more of the preceding
30 claims 10-12, characterized in that an image of one side of the bundle of banknotes is obtained by making use of a high-resolution camera as an

optical sensor, which image is processed, using a suitable data processing unit, for the purpose of determining the authenticity of the bundle.

14. A method according to any one or more of the preceding
5 claims 10-12, characterized in that an image of one side of the bundle of banknotes is obtained by making use of a high-resolution camera as an optical sensor, which image is processed, using a suitable data processing unit, for the purpose of determining the number of banknotes in a bundle.

10 15. A method according to any one or more of the preceding claims 10-12, characterized in that said determination of the number of banknotes in a bundle of banknotes is carried out by irradiating one side of the bundle with far infrared light at a number of angles of incidence and carrying out a time measurement on the reflected radiation.

15 16. A method according to any one or more of the preceding claims 10-12, characterized in that an image of one side of the bundle of banknotes is obtained by making use of a high-resolution camera as an optical sensor, which image is processed, using a suitable data processing unit, for the purpose of determining the origin and/or the
20 value of the bundle of banknotes.

17. A method according to claim 10, characterized in that the fitness of a bundle of banknotes is determined by measuring the compressibility of a bundle of banknotes.

18. A method according to claim 10, characterized in that the
25 fitness of a bundle of banknotes is determined by measuring the acoustic resistance of a bundle of banknotes.

19. A device for analysing a bundle of banknotes, which bundle comprises at least one surface defined by the edges of the banknotes, said device comprising a light source for illuminating said surface, at
30 least one optical sensor for providing a two-dimensional image, an image processing unit for processing a two-dimensional image, and providing an

output signal that represents the result of the analysis, characterized in that the optical sensor provides a two-dimensional image which is enlarged in the y-direction, which y-direction is defined as the height of the bundle of banknotes.

5 20. A device according to claim 19, characterized in that the optical sensor provides a two-dimensional image that is reduced in the x-direction, which x-direction is defined as the width of the bundle of banknotes.

10 21. A device for analysing a bundle of banknotes according to any one or more of the claims 19-20, characterized in that the optical sensor comprises a number of individual optical sensors, which optical sensors each receive a segment of the illuminated bundle of banknotes, wherein use is made of a mirror construction.

15 22. A device for analysing a bundle of banknotes according to claim 21, characterized in that said mirror construction is made up of a number of submirrors, in particular a semi-transparent mirror.

23. A device for analysing a bundle of banknotes according to any one or more of the claims 21-22, characterized in that said sensors are individually movable in x-, y- and z-directions.

20 24. A device for analysing a bundle of banknotes according to claim 19, characterized in that said optical sensor is a scanning camera, which scanning camera makes a scan of the bundle of banknotes in the x-direction.

25 25. A device for analysing a bundle of banknotes according to any one or more of the claims 19-24, characterized in that the device furthermore comprises a cutting element, which removes an amount of material from a bundle of banknotes in a plane perpendicular to the z-direction, which cut surface is used as the surface in the illuminating step.